BIOLOGICAL EVALUATION
Douglas-fir Tussock Moth Infestation

Pinal Peak
Globe District
Tonto National Forest
Arizona

1971

Larval and egg mass surveys were conducted at Pinal Peak, Tonto National Forest, on August 4 and 5 and October 12, 1970, respectively. Moderate defoliation, with localized areas of severe defoliation, occurred throughout the infested area in the summer of 1970. The surveys showed the larval and egg mass populations to be low. Larvae and egg masses collected during the surveys were sent to the Forestry Sciences Laboratory, Corvallis, Oregon, to determine natural virus incidence in the population. Scientists at the laboratory found a high incidence of natural virus in both the larval and egg mass rearings.

Results of the surveys and virus work indicate a collapse of the population in 1971.

Technical Information

Insect - The Douglas-fir tussock moth, Hemerocampa pseudotsugata McDunnough

Hosts - White fir, Abies concolor (Gord. & Glend.) Lindl., and Douglas-fir, Pseudotsuga menziesii var. glauca (Beissn.) Franco

Type of Damage - Moderate to severe defoliation occurred in 1970. Some trees were defoliated completely, causing tree mortality.

Extent of Infestation - The mixed conifer stands on the north- and west-facing slopes of Pinal Peak have been infested for the past 2 years. About 400 acres of host type are affected.

Biological Information

Larval Survey

Methods - Twenty trees were randomly selected for sampling at midcrown according to the method prescribed by Mason.[1] Live larvae were collected and sent to the Forestry Sciences Laboratory, Corvallis, Oregon, to determine if natural virus was present in the population.

Results -

No. trees sampled	No. branches sampled	No. larvae and pupae	Larvae and pupae/ sample branch
20	60	112	1.87

The samples indicated that the larval population was light. This sampling method is intended for use during the 1st larval instar. Since many of the larvae were in a late instar or had already pupated, the population was probably higher than indicated by the insect counts.

The following laboratory rearing information was sent to us from the Forestry Sciences Laboratory, Corvallis:[2]

Carton No.[a]	No. larvae	% mortality			% pupated
		Virus	Parasitized	Other	
1	32	34.4	9.4	6.2	50.0
2	32	50.0	3.1	6.3	40.6
3	27	59.3	7.4	7.4	25.9
4	29	10.3	10.3	75.9	3.5
5	31	22.6	6.5	3.2	67.7
6	35	37.2	8.5	28.6	25.7

[a] Containers in which mass-collected larvae were shipped in.

A natural virus was present in the larval population in addition to parasitism.

[1] Mason, R. R. 1969. Sequential sampling of Douglas-fir tussock moth populations. USDA Forest Service Research Note PNW-102. 10 p.
[2] 4500 Forest Insect Research memo, August 26, 1970, from Milton J. Stelzer, Forestry Sciences Laboratory, Corvallis, Oregon.

Egg Mass Survey

Methods - Twenty-two trees, near Ferndell Cabin, were chosen at random and sampled for egg masses according to the method prescribed by Mason.3/ The number of new and old egg masses was calculated on the basis of foliage area examined. Results were compared with Mason's3/ sequential sampling plan to determine the level of infestation. Egg masses were also sent to the Forestry Sciences Laboratory to determine the incidence of nuclear polyhedrosis virus in the population.

Results -

No. trees sampled	No. branches sampled	In.^{2} of foliage	No. new egg masses	No. old egg masses
22	88	58,532	14	8

The number of new egg masses per 1,000 square inches of foliage averaged 0.24, and the number of old egg masses per 1,000 square inches of foliage averaged 0.14. According to the sequential sampling plan, the egg population is light.

The following prevalence of nuclear polyhedrosis virus was found in the specimens reared from the egg masses:4/

1. Egg masses producing virus-infested larvae ------- 100%.
2. Range of virus prevalence per egg mass --- 30% to 70%.
3. Average virus prevalence for the sample (of all larvae) ---------- 56.25%.

The virus prevalence is so high that the laboratory personnel predict a collapse of the infestation this spring.

3/ Mason, R. R. 1969. Sequential sampling of Douglas-fir tussock moth populations. USDA Forest Service Research Note PNW-102. 10 p.
4/ 4500 Forest Insect Research memo, April 15, 1971, from C. G. Thompson, Forestry Sciences Laboratory, Corvallis, Oregon.

Discussion and Recommendation

Because of the very high virus incidence and also the low number of egg masses, we feel that suppression will be unnecessary in 1971. Some light defoliation may occur before the larval population subsides.

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